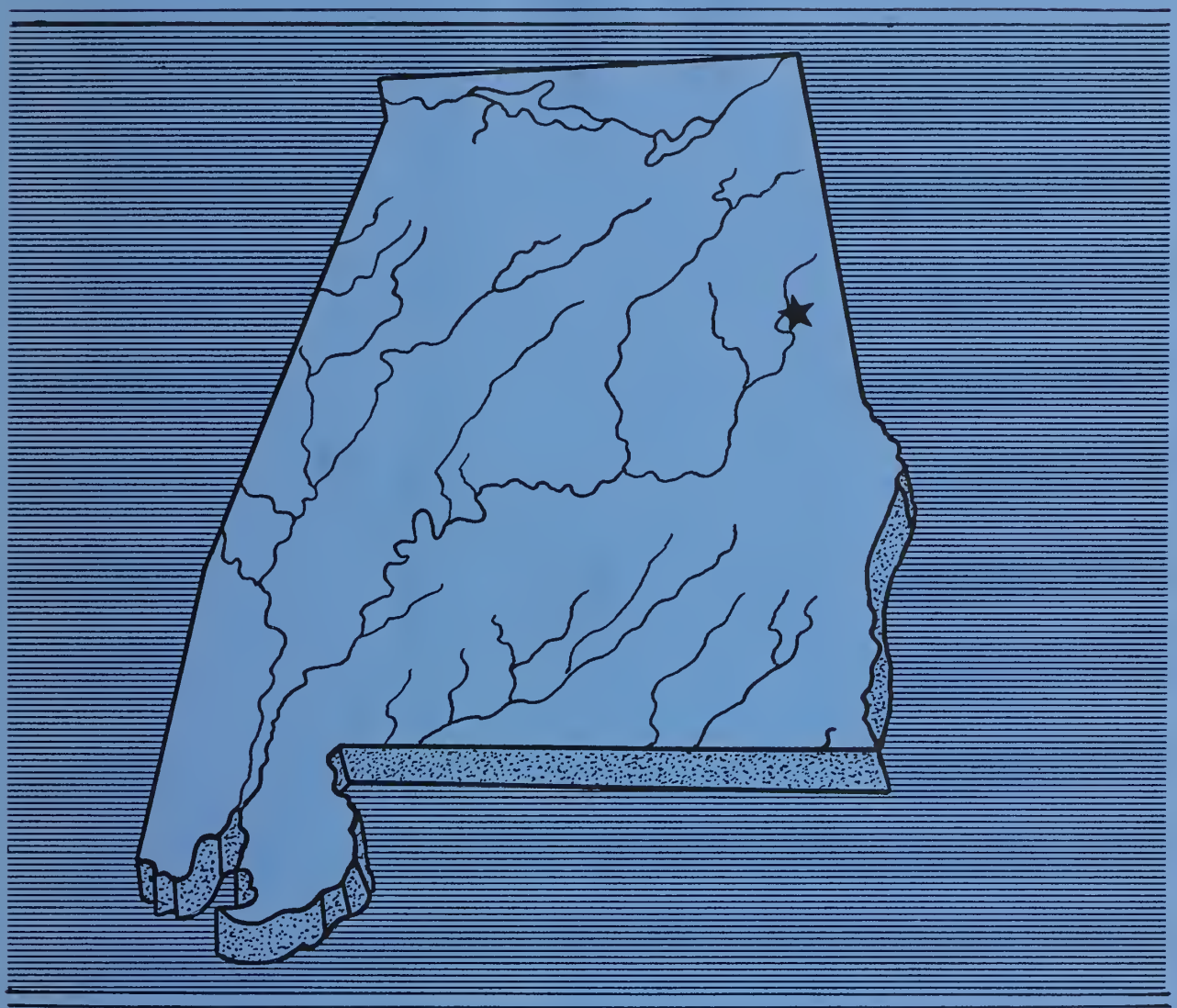
WATERSHED WORK PLAN
FOR

DYNNE
WATERSHED



CLEBURNE COUNTY
ALABAMA

4-30831 9-71
USDA-SCS-FORT WORTH, TEX.

(*—*)

WATERSHED WORK PLAN AGREEMENT

between the

Dynne Creek Watershed Conservancy District
Cleburne County Soil and Water Conservation District
Cleburne County Commission
(hereinafter referred to as the sponsoring local organization)

State of Alabama

and the

Soil Conservation Service
United States Department of Agriculture
(hereinafter referred to as the Service)

Whereas, application has heretofore been made to the Secretary of Agriculture by the sponsoring local organizations for assistance in preparing a plan for works of improvement for the Dynne Creek Watershed, State of Alabama, under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; 68 Stat. 666) as amended; and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the Service; and

Whereas, there has been developed through the cooperative efforts of the sponsoring local organizations and the Service a mutually satisfactory plan for works of improvement for the Dynne Creek Watershed, State of Alabama, hereinafter referred to as the Watershed Work Plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the sponsoring local organizations and the Secretary of Agriculture, through the Service, hereby agree on the watershed work plan, and further agree that the works of improvement as set forth in said plan can be installed in about five years.

It is mutually agreed that in installing and operating and maintaining the works of improvement substantially in accordance with the terms, conditions, and stipulations provided for in the watershed work plan;

1. Except as hereinafter provided, the sponsoring local organizations will acquire without cost to the Federal Government such land rights as will be needed in connection with the works of improvement.

(Estimated cost $29,790). The percentages of this cost to be borne by the sponsoring local organizations and the Service are as follows:

Works of Improvement	Sponsoring Local Organizations (percent)	Service (percent)	Estimated Land Rights Cost (dollars)
All Structural Measures	100	0	$29,790

2. The sponsoring local organizations will provide relocation advisory assistance services and make the relocation payments to displaced persons as required by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971, and the Regulations issued by the Secretary of Agriculture pursuant thereto. Prior to July 1, 1972, the sponsoring local organizations will comply with the real property acquisition policies contained in said Act and Regulations to the extent that they are legally able to do so in accordance with their State Law. After July 1, 1972, the real property acquisition policies contained in said Act shall be followed in all cases.

The Service will bear 100 percent of the first $25,000 of relocation payment costs for any person, business, or farm operation displaced prior to July 1, 1972. Any such costs for a single dislocation in excess of $25,000 and all costs for relocation payments for persons displaced after July 1, 1972, will be shared by the sponsoring local organizations and the Service as follows:

	Sponsoring Local Organizations (percent)	Service (percent)	Estimated Relocation Payment Costs (dollars)
Relocation Payments	26.66	73.34	0*

* Investigation has disclosed that under present conditions the project measures will not result in the displacement of any person, business, or farm operation. However, if relocations become necessary, relocation payment will be cost shared in accordance with the percentages shown.

3. The sponsoring local organizations will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to State law as may be needed in the installation and operation of the works of improvement.

4. The percentages of construction costs of structural measures to be paid by the sponsoring local organizations and by the Service are as follows:

Works of Improvement	Sponsoring Local Organizations (percent)	Service (percent)	Estimated Construction Cost (dollars)
Two Floodwater Retarding Structures and about 7 miles of Stream Channel Improvement	0	100	$266,020

4A. The percentages of fire suppression equipment cost to be paid by the sponsoring local organizations and by the Service are as follows:

Works of Improvement	Sponsoring Local Organizations (percent)	Service (percent)	Estimated Construction Cost (dollars)
Fire Suppression Equipment	50	50	$3,000

5. The percentages of the engineering costs to be borne by the sponsoring local organizations and the Service are as follows:

Works of Improvement	Sponsoring Local Organizations (percent)	Service (percent)	Estimated Engineering Cost (percent)
Two Floodwater Retarding Structures and about 7 miles of Stream Channel Improvement	0	100	$27,860

6. The sponsoring local organizations and the Service will each bear the costs of Project Administration which it incurs, estimated to be $900 and $55,080 respectively.

7. The sponsoring local organizations will obtain agreements from owners of not less than 50 percent of the land above each reservoir and floodwater retarding structure that they will carry out conservation farm or ranch plans on their land.

8. The sponsoring local organizations will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the watershed work plan.

9. The sponsoring local organizations will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.

10. The sponsoring local organizations will be responsible for the operation and maintenance of the structural works of improvement by actually performing the work or arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.

11. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.

12. This agreement is not a fund obligating document. Financial and other assistance to be furnished by the Service in carrying out the watershed work plan is contingent on the appropriation of funds for this purpose.

A separate agreement will be entered into between the Service and the sponsoring local organizations before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

13. The watershed work plan may be amended or revised, and this agreement may be modified or terminated, only by mutual agreement of the parties hereto.

14. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

15. The program will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964 and the regulations of the Secretary of Agriculture (7 C.F.R. 15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any activity receiving financial assistance.

Cleburne County Commission
Local Organization

By _____

Title _____

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Cleburne County Commission adopted at a meeting held on _____.

_____
(Secretary, Local Organization)

Date _____

Soil Conservation Service
United States Department of Agriculture

By _____

Date _____

4-30831 9-71

Dynne Creek Watershed Conservancy District
Local Organization

By _____

Title _____

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Dynne Creek Watershed Conservancy District adopted at a meeting held on _____.

_____
(Secretary, Local Organization)

Date _____

Cleburne County Soil and Water Conservation District - Local Organization

By _____

Title _____

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Cleburne County Soil and Water Conservation District adopted at a meeting held on _____.

_____
(Secretary, Local Organization)

Date _____

WATERSHED WORK PLAN

FOR

DYNNE CREEK WATERSHED

Cleburne County, Alabama

Prepared under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress, 68 Stat. 666), as amended.

Prepared by: Dynne Creek Watershed Conservancy District

Cleburne County Commission

Cleburne County Soil and Water Conservation District

With Assistance by: U. S. Department of Agriculture, Soil Conservation Service

U. S. Department of Agriculture, Forest Service

September 1971

4-30831 9-71

TABLE OF CONTENTS

(continued)

4-30831 9-71

TABLE OF CONTENTS

4-30831 9-71

WATERSHED WORK PLAN
DYNNE CREEK WATERSHED
Cleburne County, Alabama

SUMMARY OF PLAN

The work plan for the Dynne Creek Watershed was prepared by the Dynne Creek Watershed Conservancy District, the Cleburne County Soil and Water Conservation District, and the Cleburne County Commission. Technical assistance was provided by the United States Department of Agriculture under authority of Public Law 566.

The watershed lies within the Appalachian Region and covers a drainage area of 16,200 acres in Cleburne County, Alabama. The present land use is 2.4 percent row crops, 3.2 percent pasture, 1.0 percent idle, 93.0 percent woodland, and 0.4 percent roads, houses and other miscellaneous uses.

Along Dynne Creek Watershed and its tributaries lie approximately 1,183 acres of flood plain land of which a major portion is flooded on an average of five times annually. These floodwater problems cause considerable damage to crops, pastures, county roads and bridges, and other improvements that exist in the flood plain.

Acreages in the flood plain have been taken out of crop production because of the vunerability of the soil being carried away by the spring and summer floods.

To solve the problems in Dynne Creek Watershed, the sponsors set as their objectives (1) to accelerate land treatment in order to reduce erosion and runoff from all lands within the watershed, (2) to reduce by approximately 75 percent floodwater damage that occurs within the flood plain and also reduce the frequency and magnitude of flooding in order to more effectively utilize the flood plain in accordance with its capabilities, and (3) to more effectively use the labor resources of the watershed and surrounding areas.

These objectives will be accomplished by land treatment measures for watershed protection and structural measures for flood prevention. These measures are scheduled to be applied during a five year period. The total estimated cost of installing the works of improvement is $490,475 of which $359,709 (74 percent) will be provided from P.L. 566 funds and $130,766 (26 percent) from Other funds.

Individual landowners in cooperation with the Cleburne County Soil and Water Conservation District will apply land treatment measures consisting of pasture and hayland planting, terracing, pond construction, grassed waterways, hydrologic stand improvement and tree planting in forest lands. The estimated cost of installing these measures is $110,825. The P.L. 566 share on individual farms consisting of accelerated technical assistance and cooperative forest fire control is $10,749. The remaining land treatment cost of $100,076 will come from Other funds. Of the 15,110 acres that are in forest lands, 6,700 acres are in industrial ownership with the remainder (8,410) in small private holdings.

4-30831 9-71

Forestry measures for watershed protection are proposed on 1,620 acres. These measures will contribute to flood prevention and watershed protection by reducing storm runoff and flood damage. Under continued protection and proper management forest production will be increased to enhance the future economy of the watershed.

The U. S. Forest Service, by and through the Alabama Forestry Commission, will furnish technical assistance in the application and planning of the forest land treatment measures on small private ownerships. Industrial landowners will provide their own technical assistance.

Structure measures consist of two single-purpose floodwater retarding structures, and approximately seven miles of single-purpose flood prevention stream channel improvement. The estimated installation cost is $379,650 of which $348,960 will be provided from P. L. 566 funds. The local people will incur the remainder of the installation cost, $30,690, and the total cost of operation and maintenance which is estimated to be $1,190 annually.

The total average annual benefits resulting from all planned structural measures are $28,989 (Table 6). The total average annual cost including operation and maintenance amounts to $21,706, giving a 1.3 to 1.0 benefit-cost ratio for the project.

DESCRIPTION OF THE WATERSHED

Physical Data

Location: Dynne Creek Watershed comprises a drainage area of approximately 16,200 acres in Cleburne County, Alabama. Dynne Creek Watershed originates seven miles southeast of Heflin, Alabama (population 3,000), and flows in a southwest direction to its confluence with the Tallapoosa River. The watershed is located in east central Alabama. Dynne Creek Watershed is served by Anniston (population 31,000) which is located twenty miles to the west.

Geology and Soils: The watershed lies within the Southern Piedmont Land Resource Area and is in the Appalachian Region. The area, dominantly steep and hilly, is underlain by schists and phyllites. Most of the upland soils on the steeper slopes are in the Tallapoosa series with a lesser amount of the more clayey Tatum soils on the narrow ridgetops and upper side slopes. These upland soils are suited chiefly to woodland. Some of the less sloping areas are suited to pasture and hayland. The flood plain soils are the most productive in the watershed and are well suited to production of row crops, pasture, and trees. Flood plain soils are dominantly in the Chewacla series, capability class IIIw with lesser amounts in the Riverview and Roanoke series, capability classes IIw and IVw respectively.

Climate: The average annual rainfall in this area is approximately 54 inches. Short periods of very dry and very wet weather are common. October is normally the driest month and March the wettest, with a mean

4-30831 9-71

monthly precipitation of 2.58 and 6.09 inches respectively. Intense showers and thunderstorms of short duration are common during the spring months. Severe droughts are uncommon, but dry conditions prevail from midsummer to late fall. Winters are relatively mild and summers are warm. The average annual temperature is 62 degrees, with temperatures ranging from an average low of 45 degrees in December to a high of 80 degrees in July. The length of the growing season is approximately 220 days, with the last killing frost generally occuring in April and the first in October.

Land Use and Cover Conditions: The present land use within the watershed consists of approximately 396 acres of cropland, 509 acres of grassland, 15,110 acres of woodland, 68 acres of miscellaneous uses and 117 acres of idle. The future land use within the watershed after project is installed will consist of approximately 683 acres of cropland, 812 acres of grassland, 14,585 acres of woodland, 97 acres of miscellaneous uses and 23 acres of idle land.

The status of accomplishments to date in solving soil and water management problems of the watershed are shown in Table 1A. Vegetative practices are being used to provide protection from erosion, reduce runoff and improve soil conditions generally. These land treatment measures include conservation cropping system, field border plantings, ponds, grassed waterways, drainage mains and laterals, pasture and hayland planting, pasture and hayland management, terracing, wildlife upland habitat management, tree planting, woodland improvement, and fire control.

Ninety-three percent, or 15,110 acres, of the watershed is forested. The hydrologic condition of these lands is: 40 percent fair; 55 percent poor; and 5 percent very poor. This predominance of poor condition reflects past damages from overcutting and cultivation. Forty-five percent of the present forested area is in old fields.

Although conditions are slowly improving under the young forest stands now occupying the land; the firm mineral soil often has only a thin layer of litter and no build-up of humus. During storm periods these areas produce excessive surface runoff contributing to downstream erosion and flood damage. With increased forest protection and installation of the prescribed land treatment measures, the hydrologic condition of the watershed will improve.

Water Uses and Sources: Water for farm and domestic use is obtained from dug and drilled wells. There are several farm ponds in the watershed which are used for watering livestock. Also other sources of water are farm ponds and live streams.

Economic Data

The economy of the watershed is basically dependent upon farming and related industries. The principal farm enterprises in this area are row crop, beef cattle production, and forest products. Corn and soybeans are the major row crops with the production of hay being an important enterprise. A reduction in corn and an increase in soybeans and pasture has taken place over the past few years. The major cropland is located on

4-30831 9-71

the gentle slopping land and flood plain land. The steeper land is in either grass or woods.

The present land use is 2.4 percent row crops, 3.2 percent pasture, 93 percent woodland, 1.0 percent idle and 0.4 percent miscellaneous.

The forest type composition is pine, 50 percent; pine-hardwood, 25 percent; hardwood, 15 percent; and hardwood-pine, 10 percent. Principal species are loblolly and shortleaf pine, dogwood, black gum, hickory, yellow popular, persimmon, post oak, red oak, black jack oak, and sweet gum.

Virtually all of the forested land has been either logged or cleared for cultivation in the past, thus the present stands consist of principally young second growth. Stand sizes are young sawtimber, 35 percent; poles, 40 percent, seedlings and sapling, 25 percent. About 85 percent of the area is well stocked with merchantable tree species. Stocking on the rest of the area is rated as medium. The U. S. Forest Service administers no land in the watershed.

Forty-six percent of the forest land is owned and administered by timber companies and other large landowners with the rest being in small privately owned tracts.

The Alabama Forestry Commission, in cooperation with U. S. Forest Service, through various Federal-State cooperative forestry programs is providing forest management assistance, forest fire protection and forest pest control assistance to landowners in the watershed. This assistance will continue throughout the installation period.

There is no indication that the present land use or ownership patterns will change significantly during the installation period. Given continued protection and proper management, the forest stands of the watershed will contribute a great deal to the economy of the area both in production of forest products and reduction of damages to other lands from excess runoff.

Pulpwood companies own 6,700 acres, which is 44 percent of the woodland. The remaining 56 percent, consisting of 8,410 acres is in private holdings. The Coosa River Newsprint, a pulpwood processing plant, is located at Childersburg and provides a good market for pulpwood in the area. There are local saw mills which handle the saw timber.

Average farm size has increased as the number of farms has decreased. There are approximately 164 farms in the watershed averaging 100 acres in size. The private ownership of farms range in size from 10 to 1,055 acres. The largest commercial farm in the watershed totals 4,380 acres.

The value of land ranges from $75 to $300 per acre. The upland value ranges from $75 to $200 per acre, with flood plain land being valued from $100 to $300 per acre. The average value of land and buildings per farm in Cleburne County is approximately $14,143. 1/.

1/ Based on the 1964 United States Census of Agriculture, adjusted

4-30831 9-71

Approximately 51 percent of the private farms in Cleburne County, Alabama, are in the lowest economic class, as listed in the U. S. Census of Agriculture. The total value of products sold from these farms ranges from $50 to $2,499 per year. Seven percent of the farms realized annual sales ranging from $2,500 to $4,999 and 42 percent had annual sales that exceeded $5,000 per year.

There exist in the watershed unemployed and underemployed available labor resources. The 1964 U. S. Census of Agriculture indicates that approximately 51 percent of the farms had total sales of less than $2,500 in 1964. This means that annual labor income is only about $1,000 to $1,500 per farm family in this group after production expenses are deducted. Annual income to those with sales of $5,000 or more is approximately $3,000 after production expenses are deducted.

The watershed is adequately spanned by highways, paved county roads, and field roads. U. S. Highway 78 which runs parallel to the watershed is located seven miles to the north. State Highway 19 provides a route through the watershed. The county roads along with the State and U. S. Highways provide adequate routes to local markets.

Cleburne County is in the Appalachian area and is included in the Coosa Valley Resource Conservation and Development Project.

The total population of the watershed is approximately 562, Heflin with a population of 3,000 is the nearest town to the watershed.

Land Treatment Data

The Cleburne Soil and Water Conservation District has assisted 21 landowners in the watershed with soil and water conservation plans for their farms. These plans cover 4,033 acres or 25 percent of the watershed area. Approximately 50 percent of the needed land treatment measures have been applied and are valued at $113,776.

Fish and Wildlife Resource Data

Wildlife populations range from low to moderate. Rabbit, squirrel, quail and dove are moderate in numbers. Deer and wild turkey are low to moderate in numbers. Fox and raccoon are moderate in number, but the hunting of them is negligible.

Stream fishery is of low value in the watershed. The principal species of fish are bass, bluegill, sunfish, bullheads, and suckers.

There are a small number of crappie and catfish.

WATERSHED PROBLEMS

Floodwater Damage

A major problem in the watershed is the damaging floods which inundate

4-30831 9-71

1,183 acres of flood plain along Dynne Creek and its tributaries. Damaging floods occur on an average of five times each year with three of these occuring during the cropping season.

The flood plain is the most productive crop and pastureland in the watershed, with values of land and improvements ranging up to $300 per acre. Flood plain farming has changed from row crops to more pastureland because of the loss of top soil during floods. Many landowners desire to utilize this flood plain for row crops of corn and soybeans but are not willing to take the chance of losing their crops and fields to recurring floodwaters. The frequency of flooding is caused by the low capacity of the existing channel and relative flatness of the flood plain.

Damaging floods have increased management problems related to the proper use of the bottom land soils. This has resulted in reduced income potential and increased shifts in land use from the flood plain to upland areas. The quality of pasture and row crops is damaged by frequent flooding that occurs throughout the year. This is reflected in the reduced nutritional value and palatability of pasture grasses and reduced yields of row crops. Other agricultural improvements such as fences, drainage systems, field roads, and bridges are being damaged. County roads and bridges are damaged in that road fills must be replaced along with repairing bridge abutments. Indirect damages consist of delayed rural mail delivery and re-routed traffic.

Average annual floodwater damages are estimated to be as follows: $7,685 to crops and pastures, $1,770 other agriculture, $3,600 roads and bridges, and $2,324 of indirect damages. The floods usually occur during the months of March, April and May, which is the planting and early growing season.

Sediment Damage

Sediment production from the watershed is moderate. During periods of overbank flow, fine sediment is deposited on crops and pasture. Smaller areas are affected by sandy material being deposited on the soil which are less fertile than the soil on which they are laid.

Infertile deposition reduces the productive capacity of the land for several years until natural fertility can be rebuilt. Deposition of this type on 105 acres of flood plain land has reduced the income from the affected areas by 10 to 40 percent and amounts to $421 average annual sediment damages.

Erosion Damage

Erosion damage to uplands in the watershed consists of loss of soil from fields, pastures, and roadbank ditches. Sheet erosion is moderate, while gully erosion is low. Scour damages are of a moderate nature. Sheet erosion has resulted in the reduction of fertility of the soil and has exposed more easily erodible subsoil to attack by wind and water. Gully erosion has resulted in filling of ditches, or in some cases deepening of ditches and increased roughness of unpaved roads, all adding to

4-30831 9-71

road maintenance costs and creating unsightly public roads.

Flood plain erosion and scour damages occur on 83 acres. This reduces the income from these acres by 10 to 30 percent and amounts to $331 average annual erosion damages.

Problems Relating to Water Management

There is a need for some field drainage that will be installed by the individual landowners as land treatment measures.

Fish habitat in Dynne Creek is being damaged by silt deposits. This is one reason that the fishery is of low value.

PROJECTS OF OTHER AGENCIES

There are no projects of other agencies in this watershed.

PROJECT FORMULATION

The Coosa Valley RC&D project recognized the potential of Dynne Creek for planning as a P.L. 566 project. This plan as formulated meets this recommendation of the Coosa Valley RC&D Project. This project's objective does not conflict with any of the Coosa Valley planning agency's goals.

Project formulation was based on the objectives of the sponsoring local organizations which have been agreed to by the Service. These objectives are (1) to accelerate land treatment in order to reduce erosion and runoff from all lands within the watershed, (2) to reduce by approximately 75 percent floodwater damages that occur within the flood plain and also reduce the frequency and magnitude of flooding in order to more effectively utilize the flood plain in accordance with its capabilities, and (3) to more effectively use the labor resources of the watershed and surrounding areas.

The project objectives are met as follows:

(1) Total land treatment needs were estimated from the present land use and records of land treatment work already planned and installed on cooperating farms. Accomplishments to date were subtracted from total planned. Remaining needs were further adjusted by applying a compliance factor. The present going rate of planning and application were taken from these future needs and the remainder is the acceleration needed during the installation period in order to accomplish the land treatment objectives.

The forest land treatment program was developed from a field survey of the watershed and is based on needs not being met by other programs. The scope of the program is limited by the anticipated extent of landowners participation and the length of the installation period.

The present forest cover has been effective in healing much of the

damage from past land abuse, so that soil erosion on the forested lands is no longer a problem. However, the restoration of the humus layer necessary for good water handling capability within the soil requires a considerably longer period of time and has not yet been achieved. Therefore, the forested lands, although not eroding themselves, are still producing excess water runoff which contributes to erosion problems on other lands.

Poor and very poor hydrologic conditions prevail on 60 percent of the forested lands. However, most of these areas are adequately stocked with desirable humus building species and given adequate protection, treatment and time, considerable improvement can be expected.

During the period 1964 through 1968, an average occurrence of 4 fires per year resulted in an average annual burn of 0.42 percent of the forest land area. Comparison of this record with the 1968 state fire loss index goal of 0.25 percent and the small watershed protection goal of 0.20 percent indicated a need for strengthening fire control activities.

Provided in this plan is a fund of $3,000 for fire control equipment. Of this fund P. L. 566 funds will provide $1,500 to be matched by the Alabama Forestry Commission for purchase of a 3/4-ton pick-up equipped with a slip-on tanker and radio. Also, the Cooperative Forest Fire Control Program will provide additional assistance valued at $1,600 for fire protection within the watershed during the installation period.

(2) After considering adequate land treatment, excessive runoff still remained in Dynne Creek which had to be controlled in order to give the level of flood protection desired. The system of structural measures provided for in this plan give a 73 percent reduction in floodwater damage to the agricultural area.

(3) During the construction of this project, local labor will be used, thereby providing income to the previously unemployed. This will generate economic growth in the area. Once construction is completed, local labor will be used to operate and maintain the works of improvement.

To meet the project objectives, all available floodwater retarding structures were studied. Sites 1 and 2 were determined to be the most economical and provide the maximum protection against floodwater damages. In addition to floodwater retarding structures, clearing and shaping and channel enlargement will be performed on channels which gives a 23 percent reduction in floodwater damages.

WORKS OF IMPROVEMENT TO BE INSTALLED

Land Treatment Measures

A land treatment program that will reduce erosion, sediment, and the rate of runoff is a primary objective of the watershed sponsors. Land treatment measures will be installed in an effective conservation program based upon the use of each acre of agricultural land within its capabilities

and treatment in accordance with its needs to provide a sound flood prevention and water management program. The estimated acreages of the major land uses and the cost to adequately treat these acreages are shown in Table 1.

Soils maps of a general nature are available in Cleburne County and are being used as a basis for determining suitable land treatment. The measures for land treatment on privately-owned land will be planned and installed on an individual farm basis under the accelerated program of the Cleburne County Soil and Water Conservation District.

Alternative combinations of practices to be applied on 373 acres of cropland in the watershed include conservation cropping systems, crop residue management, terracing, grassed waterways, drainage mains and laterals, contour farming, chisel and subsoiling, diversions and wildlife upland habitat management. Approximately 700 acres of grassland will receive land treatment measures that include ponds, pasture and hayland planting, pasture and hayland management, diversions, and drainage mains and laterals.

Land treatment measures on forest land are designed to reduce runoff; thus, reducing the volume and damaging effects of floodwater flow onto non-forested lands. Forest litter produced under proper management and protection is the basic ingredient in the development of a deep humus layer needed to increase infiltration rate and water storage capacity of the soil. Management of the forest to improve the stocking and growth of desirable species having good humus producing characteristics will stimulate build-up of the humus layer and development of well agregated soils.

A forest management plan, designed to satisfy watershed needs as a primary objective, will be prepared. Secondary objectives will be the enhancement of timber, wildlife, and recreation values as it is compatible with sound watershed management principles.

The land treatment measures planned for forest land are:

(1) Tree planting watershed protection (210 acres)
Underplanting of poor quality hardwood stands to loblolly pine or other suitable species is planned for 210 acres for the purpose of correcting the stands to better humus producing species.

(2) Stand improvement measures (1,410 acres)
Release cuttings to favor pine will be performed on 600 acres of natural stands of mixed pine-hardwood and on 210 acres of pine underplanting in former hardwood stands. Improvement cutting aimed at improving stand composition to favor preferred species and create conditions suited for maximum production of litter, humus, and forest cover is programmed for 600 acres.

(3) Cooperative Forest Fire Control Program
The Alabama Forestry Commission will accelerate the going Cooperative Forest Fire Control Program on the watershed to reduce damage to hydrologic and other resource values.

4-30831 9-71

Structural Measures

Floodwater Retarding Structures

Structural measures consist of two-single purpose floodwater retarding structures and approximately 7 miles of stream channel improvement. The planned location of the structural works of improvement are shown on the project map, and the details of each structural measure are shown on Tables 3 and 3A.

The present land use of the sediment pool, embankment and emergency spillway area of structure site No. 1 is 100 percent woodland. Land use of the sediment pool of structure No. 2 is approximately 50 percent woodland and 50 percent pasture. The embankment and emergency spillway areas are 100 percent woodland.

The floodwater retarding structures will be earth-fill dams with an upstream berm located at the normal pool level for wave erosion protection. A drainage system is planned for each embankment to provide internal and foundation drainage. The floodwater retarding structures are planned to have an effective life of 100 years.

The principal spillways on both structures consist of a reinforced concrete two-stage inlet and a prestressed reinforced concrete pipe. The principal spillway designs are based on the 50-year 24-hour and the 50-year 10-day precipitation. Runoff curve numbers were determined using an antecedent moisture condition of II$\frac{1}{2}$.

The emergency spillways are vegetated spillways designed to permit passage of the runoff from a 15.5 inch 6-hour rainfall using an antecedent moisture condition of II$\frac{1}{2}$ with a maximum frequency of use of once in 100 years.

The excavated material from the emergency spillway and adjacent areas, consisting of soils classified as ML's and GM's by the Unified Soils Classification System, will provide the necessary fill material for the floodwater retarding structures.

Suitable vegetation will be established on the embankment, emergency spillway, and borrow areas. Vegetation in the emergency spillway will be established to permit flow velocities in accordance with Soil Conservation Service Engineering Memo 27.

The total drainage area controlled by the two floodwater retarding structures is 6,521 acres or 40 percent of the entire watershed area.

The reservoir capacity of the two floodwater retarding structures provides for the 100 year sediment accumulation and for the detention of 2,833 acre-feet of floodwater which is 5.2 inches of runoff from the area above the dams.

The 50-year sediment pool level of site No. 1 was considered to be an undesirable impoundment because of the amount of shallow water. To

4-30831 9-71

correct this situation, the principal spillway crest was raised to the 100-year sediment pool level. The 50-year sediment pool level of site No. 2 was considered to be a satisfactory impoundment.

The installation of floodwater retarding structure No. 1 will require no alteration of existing improvements. Floodwater retarding structure number 2 will require the temporary closing of two county roads. One of these roads, located in the sediment pool, will be raised a few feet above the 50 year sediment pool level. The Cleburne County Commission will be responsible for raising the road in the sediment pool and for temporarily closing the roads.

The State Attorney General has ruled that the only requirement for the Cleburne County Commission to close the road by flooding is to barricade the road and post signs that the road is closed.

Flood Prevention Channels

The approximately 7 miles of stream channel improvement planned will consist of 4.4 miles of channel enlargement, and 2.6 miles of clearing and shaping the channel. Clearing and shaping includes the removal of logs, trees, brush, gravel bars, and other debris from within the wetted perimeter of the channel based on design flow. Trees and other woody vegetation will be cut off and poisoned so that the remaining stumps will extend no higher than 12 inches above the ground surface. Overhanging trees that are in danger of falling into the channel will be removed even though their base may be outside the wetted perimeter of the channel. Where channel enlargement is planned, excavation along one bank is planned wherever possible. Excavation along only one bank will help preserve the existing wildlife habitat along the opposite bank.

The spoil from the channel excavation will be spread and utilized as a maintenance roadway. Wherever possible, along reaches of realignment the old channel within the work limits will be filled with spoil. Rock fords and/or pipes will be used to permit crossing of side laterals during periods of maintenance and will reduce degrading and erosion of the laterals. The location of these structures will be determined at the time of final design of the channel improvement. Existing rock in the channel bottom will be used for grade stabilization in several locations. In three channel reaches, as noted in Table 3A, a wide shallow channel is planned to reduce excessive velocities. The entire channel cross section will be established in appropriate vegetation in order to provide a more stable condition.

The channel is designed to carry within banks the discharge from approximately a one-year frequency 24-hour duration storm. The spoil banks, berms, and channel banks with 3:1 side slopes or flatter will be established in appropriate vegetation in order to provide a more stable condition. The spoil banks, berms, and channel banks with 3:1 side slopes or flatter will be planted with grasses and/or legumes during or immediately after excavation to help stabilize the channel and reduce sediment deposition.

4-30831 9-71

Den and pool area trees will be left uninjured within the construction area when such trees will not interfere with construction operations. The Alabama Forestry Commission is available to give the technical assistance in the forestry aspects of this work.

The installation of the channel improvements will require the alteration of one county bridge by the Cleburne County Commission.

The present land use in the construction area of channel improvement is approximately 60 percent woodland and 40 percent pasture. A great portion of the woodland in the flood plain is located near the channel, which accounts for the larger amount of woodland as compared to pasture.

Design data, channel capacity, and other pertinent data for channel improvements are shown on Table 3A.

EXPLANATION OF INSTALLATION COST

Land Treatment Measures

The total cost of installing land treatment on private land, except technical assistance, will be borne by the landowners and operators with assistance that may be available under other going programs.

The total cost of installing land treatment measures is approximately $110,825 of which $10,749 will be provided from P. L. 566 funds and $100,076 from Other Funds (Table 1). Included in the total P. L. 566 cost is $4,649 to accelerate technical assistance involving conservation planning and application of essential conservation practices. This assistance will be provided by the Soil Conservation Service.

The estimated cost of treatment for the forested lands of the watershed is $35,600. Of this amount, $6,100 are P. L. 566 funds and $29,500 are from other sources. The P. L. 566 funds provide $4,600 for technical assistance in the installation of watershed protection measures and $1,500 as cost sharing on a 50-50 basis for forest fire control equipment.

The Alabama Forestry Commission will provide $1,500 for forest fire control equipment, $800 for accelerated technical assistance, a capital outlay of $1,600 under the going Cooperative Forest Fire Control Program, and additional services valued at $100 under the going Cooperative Forest Management Program.

The installation cost of forestry measures, estimated at $25,500 will be financed by the landowners and operators concerned. It is expected that the Rural Environmental Assistance Program will be available to qualified landowners for cost-sharing assistance in the installation of these measures. In addition, Appalachian Funds may be available for cost sharing assistance.

Other funds include $2,342 for technical assistance provided under the going program of the Soil Conservation Service. The remaining other funds of $68,234 will be supplied by the landowners for the cost of labor,

4-30831 9-71

machinery, and materials necessary in the installation of the land treatment measures. Cost sharing assistance for these land treatment measures may be available through the Rural Environmental Assistance Program.

The cost estimates for installing the forestry phase of the program were developed by the U. S. Forest Service and the Alabama Forestry Commission. The technical assistance cost was based on present practices of the going Cooperative Forest Management Program. The installation costs of the land treatment measures were based on present prices paid by landowners and operators to establish individual measures in the locality.

The amount of land treatment measures needed to meet treatment goals was based on a field study of the watershed and adjusted for expected landowner participation during the installation period.

Structural Measures

The total structural measure installation cost is estimated to be $379,650 of which $348,960 will be borne by P. L. 566 funds and $30,690 borne by Other funds (Table 2).

The two floodwater retarding structures and approximately 7 miles of stream channel improvement will be installed (exclusive of project administration) at an estimated cost of $323,670 of which $293,880 will be financed from P. L. 566 funds and $29,790 from Other funds.

The P. L. 566 funds include $266,020 for construction and $27,860 for engineering. The engineering services cost will be used for surveys, investigations, design and preparation of plans and specifications for structural measures including the associated vegetative work. The construction cost will be used for construction of two floodwater retarding structures at a cost of $202,870, and approximately 7 miles of channel improvement at a cost of $63,150. The cost for land rights is $29,790 which will be borne by the Dynne Creek Watershed Conservancy District. Included in this cost is $1,000 for the removal of a barn from the flood pool, $500 for removing 5 utility poles and $6,230 for raising of a county road in the sediment pool of site no. 2. One bridge will be altered for channel improvement at a cost of approximately $2,500.

Project Administration

Project Administration cost consist of contract administration and inspection services cost during the construction of the structural measures. Total project administration cost of $55,980 includes $55,080 to be borne by P. L. 566 funds and $900 to be paid by the local sponsoring organizations.

The Soil Conservation Service responsibility in Project Administration will include contract administration, review of engineering plans, and any necessary inspection service during construction to insure that structural measures are installed in accordance with the plans and specifications.

4-30831 9-71

The Soil Conservation Service will bear the expense it incurs. The local organizations will bear a cost for administering the contracts which includes cost for legal services, advertising for bids, and other administrative cost in handling contracts. The sponsoring local organizations will bear all the expenses they incur.

Costs

The construction cost for each structural measure is the estimated cost of all materials and labor necessary for the installation of that measure. The unit price assigned each quantity is based on local prevailing prices (1970) and previously constructed projects. A contingency of 12 percent was added to cover unforseen items of cost during construction.

SCHEDULE OF OBLIGATIONS

An estimated schedule of funds by project years is as follows:

Project Year	P. L. 566 Funds	Other Funds	Total
First			
Land Treatment	2,150	20,016	22,166
Structural	37,200		37,200
Subtotal	39,350	20,016	59,366
Second			
Land Treatment	2,150	20,015	22,165
Structural	115,700	4,750	120,450
Subtotal	117,850	24,765	142,615
Third			
Land Treatment	2,150	20,015	22,165
Structural	115,810	15,680	131,490
Subtotal	117,960	35,695	153,655
Fourth			
Land Treatment	2,150	20,015	22,165
Structural	80,250	10,260	90,510
Subtotal	82,400	30,275	112,675
Fifth			
Land Treatment	2,149	20,015	22,164
Subtotal	2,149	20,015	22,164
TOTAL	359,709	130,766	490,475

This schedule is estimated based on expected future involvement; however, it is subject to change depending upon the availability of funds and the difficulty encountered in acquiring land rights for structural measures.

4-30831 9-71

EFFECTS OF WORKS OF IMPROVEMENT

The proposed project will enhance the economic welfare of the area by reducing flood damages, and by providing job opportunities for the unemployed. This project will enable the area to more efficiently utilize its natural resources.

Land treatment measures will reduce erosion, increase infiltration rates and assure the realization of benefits used in justification of the structural works of improvement. The proposed forest land treatment measures will improve the hydrologic condition and productivity of the forest land. This will reduce sediment and retard runoff. Good management and continued fire protection will increase productivity of the forest land.

The works of improvement will benefit 1,183 acres of flood plain. The average annual acres flooded will be reduced from 1,248 to 279 or 78 percent. The storm event to be expected one year out of two will flood 708 acres under present conditions as compared to 249 acres with the project. This is a reduction of 65 percent in acres flooded. The channels will carry within banks the discharge from a 100 percent chance storm.

Reduction in frequency and acres flooded will allow farmers to restore 28 acres to former productivity, make a change in land use of 83 acres, and more intensively use 558 acres. This change reflects the taking of row crops from the upland and returning them to the flood plain. The trend being taken is planting the uplands to a more suitable cover of grasses, legumes, or trees.

The installation of the works of improvement will reduce damages to roads and bridges by $2,816 annually. The reduction in damages provided by this project will allow this amount of tax money to be used for schools or other projects as county officials deem necessary.

The project measures will provide annual indirect benefits of $1,299. These benefits result in better transportation, cheaper marketing costs, and the reduction of inconvenience caused by the flooding problem.

Installation of structural measures will benefit approximately 38 landowners in the flood plain whose farm operations have been limited due to frequent flooding of Dynne Creek.

In addition structural measures will reduce damages to agricultural areas by 73 percent.

Sediment damage to the flood plain will be reduced by approximately 60 percent. The area damaged will require from 5 to 20 years to recover. These areas will recover from 75 to 100 percent of its original productive capacity.

Scour damage will be reduced by approximately 70 percent. The area damaged will require from 10 to 15 years to recover to its original productive capacity.

4-30831 9-71

Installation of the works of improvement will provide for 25 man-years of employment during the installation period.

The landowners on whose land floodwater retarding structures are located will be encouraged to stock the pools with fish. The Alabama Department of Conservation will assist landowners with the stocking and management of these pools.

Fish and wildlife populations within this project are low to moderate in number. It is estimated that both will increase as a result of land treatment measures to be installed for wildlife and the 34 surface acres of water that will be impounded behind dams. The latter can be used for limited fish production.

PROJECT BENEFITS

Annual flood damage without project is estimated to be $16,131 with benefits from flood damage reduction estimated to be $12,028 (Table 5). Of the total damage reduction, $11,478 (Table 6) accrue annually to structural measures and $550 accrue to land treatment measures. This represents a 73 percent reduction in damages. The flood damage reduction benefits come from reductions in damages to crops and pastures, road and bridges, and other agriculture (Table 5). In addition damage reduction benefits come from reductions of sediment and scour damages on flood plain land and reductions of indirect damages.

Included in the flood damage reduction benefits are $6,203 to crops and pasture, $1,309 other agriculture, $2,816 roads and bridges, $178 sediment, $223 scour, and $1,299 indirect benefits.

Secondary benefits amount to $2,830. These accrue from increased business activity and improved economic conditions which are induced by and stem from project installation.

Changed land use benefits resulting from the installation of project measures amount to approximately $4,241 annually. These benefits result from changing idle and woodland to a more productive use because of a reduction in flooding.

Redevelopment benefits amount to $4,390. They result from wages paid to unemployed and underemployed labor used in the installation, operation, and maintenance of the project after it is installed.

More intensive use benefits amount to $5,356. The benefits accrue as a result of farmers more effectively using their land because of reductions in flood damages.

Incidental recreation benefits are estimated to be $694 annually. The benefits are those expected to accrue from use by the general public or organized groups. They are based on the expected number and value of a visitor-day per surface acre of water. Sanitary facilities meeting state and local health department regulations will be installed to meet the

4-30831 9-71

anticipated use. The structure site will be open to the general public or organized groups. The type recreation activities expected are swimming, fishing, picnicking and sight-seeing. The water quality is suitable for the expected recreation activities.

Benefits were calculated by assuming 65 visitor days per surface acre and multiplying by $.50 (value of a visitor day). The number of visitor days was determined to be 2015. After finding the unadjusted benefits, a value of $.15 per visitor day was subtracted and then the benefits were adjusted because the sediment pool will fill with sediment which will cause the pool to become undesirable for recreation uses.

In addition to the monetary benefits evaluated there exist intangible benefits. Some of these benefits include improved farming conditions in the flood plain, which will enable more effecient use of farm resources. This and other non-measurable benefits are desirable from a local and regional viewpoint.

COMPARISON OF BENEFITS AND COSTS

The average annual cost of planned structural measures, including operation and maintenance cost, is estimated to be $21,706. The average annual benefit is $28,989 which gives a benefit-cost ratio of 1.3 to 1.0 This includes local secondary benefits of $2,830 annually (Table 6). The benefit-cost ratio without local secondary benefits would be 1.2 to 1.0.

PROJECT INSTALLATION

Land Treatment Measures

Land treatment measures on private and commercially owned lands will be established within the five-year installation period by the individual farmers in cooperation with the Cleburne County Soil and Water Conservation District. The district will provide technical assistance for planning and application of the land treatment measures. Using P. L. 566 funds, the Soil Conservation Service will accelerate the rate of planning and application of land treatment measures.

Forest landowners will be encouraged to apply and maintain the forestry measures on their forested land. The U. S. Forest Service will cooperate with and through the Alabama Forestry Commission to provide technical assistance in the planning and application of forest land treatment measures on the watershed. A forester trained in watershed management will be assigned to the project to assist landowners in the installation of the planned measures. One of the first objectives of the watershed forester will be the preparation of forest management plans for the forested lands as part of the conservation farm plans. The Cooperative Forest Fire Program will be intensified by the installation of a pickup equipped with a tanker and radio.

4-30831 9-71

Structural Measures

Structural measures will be installed during the five-year installation period. The contracts on floodwater retarding structures and channel improvement will be administered by the Cleburne County Commission.

Engineering services, design, layout, and installation of all structural measures will be provided by the Soil Conservation Service.

Land rights needed will be obtained by the Dynne Creek Watershed Conservancy District. Assistance in obtaining land rights will be provided by the Cleburne County Soil and Water Conservation District, and the Cleburne County Commission. The land rights needed will be obtained during the first two years of the installation period.

The following schedule of installation is based on the needs and desires of all sponsors.

Project Year	Structural Measures
First	Initiate Surveys and Design
Second	Construct Floodwater Retarding Structure 1
Third	Construct Floodwater Retarding Structure 2
Fourth & Fifth	Main, Lateral 3

This schedule may be changed as necessary except that floodwater retarding structures will be scheduled for installation prior to channel improvement.

FINANCING PROJECT INSTALLATION

Federal assistance for carrying out the planned works of improvement described in this work plan will be provided under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress, 68 Statute 666),as amended. This financial and technical assistance to be furnished by the Soil Conservation Service and the U. S. Forest Service is contingent upon the appropriation of funds for this purpose and the sponsors meeting their obligation.

The sponsors expect that land rights will be donated by interested landowners. The sponsors will obtain the entire land rights before any P. L. 566 assistance is provided for construction. Funds to finance all bridge and road alterations will be the responsibility of the Cleburne County Commission.

All land treatment measure costs on private lands will be borne by the individual landowners. It is expected that cost sharing assistance will be available under the going Rural Environmental Assistance Program and Appalachian funds.

4-30831 9-71

PROVISIONS FOR OPERATION AND MAINTENANCE

Land treatment measures, including forest land treatment, will be maintained by landowners or operators in accordance with their individual cooperative agreements with the Cleburne County Soil and Water Conservation Districts. The Alabama Forestry Commission, in cooperation with the U. S. Forest Service, will furnish the technical assistance necessary for operating and maintaining the forest land treatment measures under the going Cooperative Forest Management Program. Fire protection will be continued under the going Cooperative Forest Fire Control Program.

The Cleburne County Commission with consultive assistance from the Cleburne County Soil and Water Conservation District, will be responsible for operation and maintenance. Normal maintenance such as the removal of debris, control of undesirable vegetation, controlled grazing, mowing and fertilizing vegetation, will be arranged for or performed by the Dynne Creek Watershed Conservancy District using normal farm equipment. Major maintenance such as channel cleanout and repair of damage to emergency spillways, gates, trash racks, but not limited to these, will be performed by the Cleburne County Commission.

The sponsoring local organizations and a representative of the Soil Conservation Service will make a joint inspection annually. Other inspections will be made after severe floods and after the occurrence of any unusual condition which might adversely affect the structural measure. These joint inspections will continue for three years following installation of the structure. Inspection after the third year will be made annually by the sponsors. A report of the inspection will be prepared and a copy sent to the Soil Conservation Service employee responsible for operation and maintenance inspections and follow-up. Where needed, the Soil Conservation Service employee may continue to provide assistance after the third year as determined by the State Conservationist.

Items of inspection for dams will include, but are not limited to, the condition of the principal spillway, the outlet channel, the embankment, the emergency spillway, the vegetative cover, and other appurtenances of the structure. For channel improvement measures, items of inspection will include, but are not limited to the degree of scour, sediment deposition, bank erosion and obstructions to flow caused by debris accumulation.

Specific operation and maintenance agreements will be executed prior to issuance of invitations to bid. The Soil Conservation Service employee responsible for Operation and Maintenance inspections and follow-up will thoroughly review the sponsor's Operation and Maintenance reports of inspections and maintenance. Evidence that inspections and maintenance are not being performed properly will be immediately reported to the State Conservationist, who will take the appropriate action based on the reported deficiencies.

4-30831 9-71

4-30831 9-71

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST
Dynne Creek Watershed, Alabama

Installation Cost Item	Unit	Number Non-Fed. Land	Total	Estimated Cost (Dollars) 1/ P. L. 566 Funds Non-Fed. Land	P. L. 566 Funds Total	Other Non-Fed. Land	Other Total	TOTAL
Land Treatment								
Soil Conservation Service								
Cropland	Ac.	373	373			14,313	14,313	14,313
Grassland	Ac.	700	700			52,921	52,921	52,921
Technical Assistance				4,649	4,649	2,342	2,342	6,991
Wildlife	Ac.	20	20			1,000	1,000	1,000
SCS Subtotal				4,649	4,649	70,576	70,576	75,225
Forest Service								
Forest Land Treatment	Ac.	1,620	1,620			25,500	25,500	25,500
Technical Assistance				4,600	4,600	900 2/	900 2/	5,500
Coop. Forest Fire Control				1,500	1,500	3,100	3,100	4,600
FS Subtotal		1,620	1,620	6,100	6,100	29,500	29,500	35,600
TOTAL LAND TREATMENT				10,749	10,749	100,076	100,076	110,825
Structural Measures								
Construction								
Soil Conservation Service								
Floodwater Retarding Structure	No.	2	2	202,870	202,870			202,870
Channel Improvement	Mi.	9	9	63,150	63,150			63,150
SCS Subtotal				266,020	266,020			266,020
Subtotal - Construction				266,020	266,020			266,020
Engineering Services								
Soil Conservation Service				27,860	27,860			27,860
Subtotal - Engineering				27,860	27,860			27,860
Project Administration								
Soil Conservation Service								
Construction Inspection				33,185	33,185			33,185
Other				21,895	21,895	900	900	22,795
Subtotal - Administration				55,080	55,080	900	900	55,980
Other Costs								
Land Rights						29,790	29,790	29,790
Subtotal - Other						29,790	29,790	29,790
TOTAL STRUCTURAL MEASURES				348,960	348,960	30,690	30,690	379,650
TOTAL PROJECT				359,709	359,709	130,766	130,766	490,475
SUMMARY								
SCS Subtotal				353,609	353,609	101,266	101,266	454,875
FS Subtotal				6,100	6,100	29,500	29,500	35,600
TOTAL PROJECT				359,709	359,709	130,766	130,766	490,475

1/ Price base 1970

2/ Includes $100 from the going Cooperative Forest Management Program

Date: September 1971

TABLE 1A - STATUS OF WATERSHED WORKS OF IMPROVEMENT

Dynne Creek Watershed, Alabama

Measures	Unit	Applied To Date	Total Cost (Dollars) 1/
LAND TREATMENT			
Conservation Cropping Systems	Ac.	52	1,560
Ponds	No.	4	6,000
Drainage Mains & Laterals	Ft.	8,232	4,116
Pasture & Hayland Planting	Ac.	321	16,050
Terracing	Ft.	5,000	250
Wildlife Upland Habitat Mgt.	Ac.	2	100
Tree Planting	Ac.	2,000	40,000
Timber Stand Improvement	Ac.	2,000	40,000
Fire Control Program	Ac.	8,410	5,700
TOTAL			113,776

1/ Price base 1970 Date: September 1971

4-30831 9-71

TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Dynne Creek Watershed, Alabama

(Dollars) 1/

Item	Installation Cost P.L. 566 Funds			Installation Cost - Other Funds		Total Installation Cost
	Construction	Engineering	Total P. L. 566	Land Rights	Total Other	
Floodwater Retarding Structures:						
No. 1	102,240	10,220	112,460	4,450	4,450	116,910
No. 2	100,630	10,060	110,690	13,880 2/	13,880	124,570
Subtotal Structures	202,870	20,280	223,150	18,330	18,330	241,480
Channel Improvement	63,150	7,580	70,730	11,460	11,460	82,190
Subtotal Channel Improvement	63,150	7,580	70,730	11,460 3/	11,460	82,190
Subtotal	266,020	27,860	293,880	29,790	29,790	323,670
Project Administration			55,080		900	55,980
GRAND TOTAL	266,020	27,860	348,960	29,790	30,690	379,650

1/ Price base 1970
2/ Includes $1,000 for structural removal, $500 for moving utilities and $6,230 for raising 2 unpaved roads
3/ Includes $2,500 for bridge alterations

Date: September 1971

TABLE 3 - STRUCTURE DATA
FLOODWATER RETARDING STRUCTURES
Dynne Creek Watershed, Alabama

Item	Unit	Structure Number 1	Structure Number 2	TOTAL
Class of Structure		b	b	
Drainage Area	Sq. Mi.	3.21	6.98	10.10
Curve No. (1-day) (AMC 11)		71	71	
Tc	Hrs.	2.90	3.19	
Elevation Top of Dam	Ft.	972.8	968.3	
Elevation Crest Emergency Spillway	Ft.	968.9	962.7	
Elevation Crest High Stage Inlet	Ft.	954.0	950.5	
Elevation Crest Low Stage Inlet	Ft.	937.4 1/	927.0	
Maximum Height of Dam	Ft.	54	64	
Volume of Fill	Cu.Yds.	113,800	75,000	188,800
Total Capacity	Ac. Ft.	1,023	2,245	3,268
Sediment Submerged 1st 50 years	Ac. Ft.	53	133	186
Sediment Submerged 2nd 50 years	Ac. Ft.	60	150	210
Sediment Aerated	Ac. Ft.	11	28	39
Retarding	Ac. Ft.	899	1,934	2,833
Between High and Low Stage	Ac. Ft.	351	815	1,166
Surface Area				
Sediment Pool	Ac.	14 1/	20	34
Retarding Pool	Ac.	41	106	147
Principal Spillway				
Rainfall Volume (Areal) (1 Day)	In.	7.5	7.5	
Rainfall Volume (Areal) (10 Day)	In.	13.6	13.6	
Runoff Volume (10 Day)	In.	8.59	8.59	
Capacity of Low Stage (Max.)	Cfs.	60	137	
Capacity of High Stage (Max.)	Cfs.	125	274	
Frequency Operation-Emer. Spillway	% Chance	1	1	
Size of Conduit (Dia.)	In.	30	42	
Emergency Spillway				
Rainfall Volume (ESH) (Areal)	In.	8.8	8.8	
Runoff Volume (ESH)	In.	5.28	5.28	
Type		Veg.	Veg.	
Bottom Width	Ft.	250	250	
Velocity of Flow (Ve)	Ft./Sec.	2/	2/	
Slope of Exit Channel	Ft./Ft.	2/	2/	
Maximum Water Surface Elevation	Ft.	2/	2/	
Freeboard				
Rainfall Volume (FH) (Areal)	In.	15.5	15.5	
Runoff Volume (FH)	In.	12.71	12.71	
Velocity of Flow (Ve)	Ft./Sec.	9.1	10.9	
Maximum Water Surface Elevation	Ft.	972.8	968.3	
Capacity Equivalents				
Sediment Volume	In.	0.72	0.84	
Retarding Volume	In.	5.2	5.2	

1/ 100-year sediment level
2/ No flow from the emergency spillway hydrograph

Date: September 1971

4-30831 9-71

TABLE 3A - STRUCTURE DATA
CHANNELS
Dynne Creek Watershed, Alabama

Channel Name	Reach Station Ft.	Reach Station Ft.	Drainage Area Sq.Mi.	Capacity Req'd cfs	Capacity Design cfs	Water Surface[1] Elev.	Hydraulic Gradient Ft./Ft.	Channel Dimensions Bottom Ft.	Depth Ft.	Side Slope	"n" Value Aged	"n" Value As Built	Velocities Aged Ft./Sec.	Velocities As Built Ft./Sec.	Excavation Cu.Yds.	Type of Improvement 2/
Dynne Creek Main	35+00	43+00	1.1	130	140	896.0	0.00750	10	3.2	3:1	0.045	0.025	3.8	6.8	200	CE 4/
	43+00	63+50	1.9	205	205	881.0	0.00731	14	2.4	3:1	0.045	0.025	4.0	7.2	5,000	CE 4/
	63+50	92+50	4.7	465	480	868.8	0.00420	14	4.0	3:1	0.040	0.025	4.6	7.4	9,700	CE
	92+50	131+00	6.1	560	570	856.3	0.00324	21	4.0	3:1	0.040	0.025	4.3	6.9	15,500	CE
	131+00	187+00	6.7	635	635	845.5	0.00192	23	5.0	1:1	0.035	0.025	4.5	6.3	10,700	CE
	187+00	208+00	6.8	635	625	839.7	0.00276	24	4.4	1:1	0.035	0.025	5.0	7.0	1,200	CE
	208+00	242+50	9.3	820	825	829.7	0.00289	25	5.5	1:1	0.035	0.025	5.5	7.7	5,000	CE
	242+50	277+30	9.7	830	825	823.0	0.00192	A=168 WP=39 3/			0.035	0.030	4.9	5.7	2,500	C&S
	277+30	319+25	12.6	920	935	813.2	0.00234	A=173 WP=37 3/			0.035	0.030	5.4	6.3	10,500	C&S
	319+25	367+00	15.1	1050	1050	804.0	0.00192	A=207 WP=41 3/			0.035	0.030	5.1	6.0	10,500	C&S
Lat. 3	105+50	119+50	1.4	275	270	849.6	0.00740	18	2.5	3:1	0.045	0.025	4.3	7.7	2,200	CE 4/
	119+50	124+00	1.5	275	270	848.4	0.00280	18	3.4	3:1	0.040	0.025	3.7	5.9	1,500	CE
	124+00	138+00	1.7	275	270	845.6	0.00200	A=85 WP=31 3/			0.040	0.030	3.2	4.3	300	C&S
	138+00	156+50	1.8	275	270	838.2	0.00400	11	4.0	1:1	0.040	0.025	4.5	7.2	4,100	CE

1/ At downstream end of reach
2/ C.E. - Channel Enlargement, C&S - Clearing and Shaping
3/ Cross sectional area in square feet and wetted perimeter in feet below the hydraulic grade line.
Any required increase in cross-sectional area will be made by clearing debris from the channel bottom and deepening. Enlargement or realignment will be required in isolated meander areas and constrictions.
4/ Immediately after excavation is completed on each of the indicated channel reaches, the channel bottom and side slopes will be seeded to appropriate vegetation.

Date: September 1971

TABLE 4 - ANNUAL COST

Dynne Creek Watershed, Alabama

(Dollars) 1/

Evaluation Unit	Installation Cost 2/	Operation and Maintenance Cost	Total
Floodwater Retarding Structures & Channel Improvement	17,491	1,190	18,681
Project Administration	3,025		3,025
GRAND TOTAL	20,516	1,190	21,706

1/ Price base 1970: installation 1970, O&M adjusted normalized

2/ Amortized at 5 3/8 percent interest rate for 100 years

Date: September 1971

4 30631 9 71

TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFIT

Dynne Creek Watershed, Alabama

(Dollars) 1/

Item	Estimated Average Annual Damage		Damage Reduction Benefit
	Without Project	With Project	
Floodwater			
Crop and Pasture	7,685	1,482	6,203
Other Agricultural	1,770	461	1,309
Nonagricultural			
Roads and Bridges	3,600	784	2,816
Subtotal	13,055	2,727	10,328
Sediment			
Overbank Deposition	421	243	178
Subtotal	421	243	178
Erosion			
Flood Plain Scour	331	108	223
Subtotal	331	108	223
Indirect	2,324	1,025	1,299
TOTAL	16,131	4,103	12,028

1/ Price base: adjusted normalized prices Date: September 1971

4-30831 9-71

TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Dynne Creek Watershed, Alabama

(Dollars)

Evaluation Unit	Average Annual Benefits 1/						Total	Average Annual Cost 2/	Benefit Cost Ratio
	Damage Reduction	More Intensive Land Use	Changed Land Use Agr.	Secondary	Incidental Recreation	Redevelop-ment			
Floodwater Retarding Structures & Stream Channel Improvement	11,478	5,356	4,241	2,830	694	4,390	28,989	18,681	1.6:1
Project Administration								3,025	
GRAND TOTAL	11,478	5,356	4,241	2,830	694	4,390	28,989	21,706	1.3

1/ Price base: adjusted normalized prices
2/ From Table 4
3/ In addition, it is estimated that land treatment will provide flood damage reduction benefits of $550 annually

Date: September 1971

INVESTIGATION AND ANALYSES

Hydraulic and Hydrologic

A synthetic storm series was used in evaluating the watershed. Ten storms selected from the U. S. Weather Bureau publication "Rainfall Frequency Atlas of the United States, Technical Paper No. 40", representing a duration of 24 hours, were valley flood routed through the watershed. These were the 100 year, 25 year, 10 year, 5 year, 2 year, 1 year, 0.5 year, 0.33 year, 0.25 year and 0.167 year frequency storm.

Selection of an antecedent moisture condition of II and future curve number of 69 for the watershed were based on soil classification, land use, and vegetative cover. The U. S. Forest Service cooperated in providing curve data for the woodlands of the watershed. Rainfall runoff for the storm to be routed was determined in accordance with Technical Release No. 16, "Rainfall-Runoff Tables for Selected Runoff Curve Numbers".

The convex method of valley flood routing was performed using the IBM Computer 1130 and Technical Release 20, "Project Formulation Program - Hydrology". The ten above mentioned storm series were routed through three alternatives or watershed conditions. The first alternate was future condition without project; second condition included two proposed flood water retarding structures; and the third condition included both proposed flood water retarding structures supplemented by stream channel improvement. The third alternate was found to be the most desirable combination of structural measures and was proposed for installation.

Stage versus discharge, end area, flood plain width, and acres of flood plain inundated were developed for 29 valley cross-sections and two bridge openings with the use of the IBM 1130 Computer and field data collected at the cross-section locations. Stage-discharge relationships were developed for an additional 11 channel cross-sections by use of Manning's formula.

Economics

The benefit-cost evaluation of land and water resource projects was made from basic data obtained from local farmers, agricultural workers, experiment stations, and Department of Agriculture publications. Cost of installation was amortized over a 100-year period at 5 3/8 percent interest rates based on present prices (1970).

Landowners and operators in the flood plain were interviewed to determine present land use and yields, anticipated use and yield with varying degrees of protection from floodwater damage, and damage to minor fixed improvements. Yield trends reflecting improved technology were also considered. This information was evaluated and summarized by economic reaches. Damageable values were derived and used in the Econ 2 computer program. Floodwater damages were derived from the IBM 1130 computer using a frequency evaluation method where damages are related to depth of flooding.

4-30831 9-71

Restoration of former productivity benefits were estimated on the basis of a shift to a former intensity of use after reduction of the flood hazard. Associated cost and increased damages due to higher damageable values were deducted from gross benefits to give net benefits. The higher damageable values resulted from higher value crops being grown in the benefited flood plain.

More intensive use benefits were calculated on the basis of expected increase in crop yields. These increases in yield will result from increased use of fertilizers and better managerial practices made profitable by reducing the flood hazard. Benefits claimed were lagged 5 years while the project is being installed.

Incidental recreation benefits of the project were calculated based on the value of visitor-days per surface acre. The number of visitor-days per surface acre was multiplied by the number of surface acres at the 50-year sediment pool of site 2 to get the number of visitor-days per surface acre. A value of $.50 per visitor-day was assumed. Annual incidental recreation benefits were determined by multiplying $.50 times the number of annual visitor-days which was then adjusted to get net benefits. The adjustment includes the deduction of associated costs arising from installation of the facilities, their replacement, operation and maintenance. It also includes reduction in use caused by filling of sediment pools.

Changed land use benefits resulting from the installation of project measures are based on the difference in income from idle to pasture, corn, or soybeans. Also, benefits were claimed based on the clearing of woods in some of the better protected reaches and establishing the areas to pastures. Associated cost and increased damages due to higher damageable values were deducted from gross benefits to give net benefits. Net benefits claimed were lagged 5 years after the project is installed.

Redevelopment benefits resulting from installation of project measures are based on utilization of unemployed local labor. The amount of construction cost spent for local labor was estimated to be about 30 percent. Thirty percent of the construction cost was converted to an annual amount by amortization at 5 3/8 percent interest over a 100-year period. Redevelopment benefits resulting from employment in operation and maintenance of project measures were estimated by taking 50 percent of the operation and maintenance cost and dividing by 25 years to obtain a rate of decline per year. This was multiplied by the present value of a decreasing annuity to obtain the present capital value. The present capital value was amortized at 5 3/8 percent interest for 100 years to obtain the annual benefit.

The evaluation of local secondary benefits stemming from the project was derived by applying a 10 percent factor to the sum of all primary project benefits (excluding indirect and incidental recreational benefits). Local secondary benefits induced by the project were based on the difference in total production cost of crops and pasture with and without the project. A 10 percent factor was applied to this difference in production cost and also to the annual associated cost to get the gross annual benefit.

The method used in evaluating land damage was based on flood plain scour

4-30831 9-71

and sediment where damage and recovery are in equilibrium. Recovery of productivity is occuring at approximately the same rate as other areas are being damaged. Data furnished by the geologist and used in the evaluation included the location and percent of flood plain damaged and the amount of damage that could be recovered. The dollars of damage calculated were based on the loss of net value of production from scour and sediment. The time required for recovery of damages was also taken into consideration. The cost for land rights was determined based on local prevailing prices. The cost per acre for land rights for site number 1 was determined to be $150 per acre. The cost per acre for site number 2 was $100 per acre, for channel improvement, land rights cost is $125 per acre. The flood pool of site 2 will flood two county dirt roads. The county will block traffic from these roads during periods of inundation. A barn, telephone line, and power line in the flood pool will have to be relocated. The total cost for land rights in this watershed is estimated to be $29,790. The land rights cost will be borne by the Dynne Creek Watershed Conservancy District and the Cleburne County Commission.

Forestry

A systematic field survey produced information on ground cover, forest and hydrologic conditions, and treatment needs. Data from this survey, supplemented by information from other agencies and forestry officials formed the basis for determining the amount of remedial measures. The measures recommended contribute to flood reduction and soil stabilization.

Engineering

All possible floodwater retarding structures in the watershed were located after a study of the drainage area size and pattern, photographic and topographic coverage was made. Further study and field investigation eliminated all except two sites (see project map).

Both floodwater retarding structures were classified as Class "b" and were designed based on criteria set forth in Engineering Memo AL-6 (Rev.). This memorandum establishes minimum state criteria for planning and design of dams and supplements Washington Engineering Memo 27. The hydrologic criteria for the design of dams as established by AL-6 (Rev.) exceeds that set fourth in SCS Memo 27 by increasing the antecedent moisture condition of the principal spillway storms and the freeboard storm for Class "b" from II to II$\frac{1}{2}$.

Topographic maps were made of the reservoir area and of the embankment area using a plane table and telescopic alidade. These maps were used to develop the stage-area and stage-storage curves and for detail location of the embankment and emergency spillway. These curves and topographic maps should be adequate for final design.

The principal spillway design storm was computer-routed through various pipe sizes with single-stage and two-stage inlets. The design of the principal spillway was chosen after analyzing the computer output data.

4-30831 9-71

Consideration was given to the use of single or two-stage inlets, pipe size, average release rate, needed channel improvement, structure cost, safety of the structure, and the level of protection provided.

The location of the emergency spillway was chosen after studying the available photographs and topographic maps and after making a field study of the site conditions. The width and depth of the emergency spillway was choosen after computer routing the emergency and freeboard design hydrographs using various emergency spillway dimensions. Both of the emergency spillways are designed as vegetated spillways.

Channels

A field investigation was made of all streams within the watershed. Valley and channel cross-sections were located using the field data, aerial photographs, and blue line maps. These cross-sections were surveyed and referenced to mean sea level. Manning's "n" values for these cross-sections were selected in accordance with Supplement B, Section 5, Hydraulics, of the National Engineering Handbook.

These cross-sections were analyzed as to their capacity based on the peak discharge produced by a 1.0 year frequency 24-hour duration storm. The need for and type of channel improvement was selected for different reaches. A centerline for the planned channel improvement was determined using aerial photographs, blue line maps, and field data. This centerline was then checked in the field.

Present channel stability is good; degradation is non-existant and bank cutting is minor, Channel silting is a problem in some reaches.

Rock is visible in the streambanks and bottoms at several locations. Most of the channel bed material is composed of coarse sand, gravel and cobbles in the size range of $\frac{1}{2}$ inch to 3 inches in diameter.

The channel banks are composed of fairly uniform soils without significant variations such as sand pockets, buried channel fillings or other conditions which would tend to cause instability. Five samples of bank material were chosen for their representation of average conditions. Samples were classified by field procedures and classification tests were run to determine plasticity and gradation. All the samples classed as slightly plastic SM's or sandy ML's. A representative bank material has a D_{75} size of approximately 0.2 millimeters.

Important factors in the stability of banks and spoil berms are the local climate and productivity of soils. Alluvial soils in Dynne Creek Watershed are very productive in capability classes IIw and IIIw. A good vegetative cover can be rapidly achieved and easily maintained on these soils with the mild climate and $4\frac{1}{2}$ inch monthly rainfall average. It should be noted that in this part of Alabama channels require annual maintenance to prevent excessive vegetative growth. Vegetation of the spoils, berms, and channel banks with 3:1 side slopes or flatter will be established immediately after excavation and will be studied one year later. Channel

4-30831 9-71

stability in these areas is to be achieved by excavating a wide and shallow channel. The spoils, berms, and channel banks with 3:1 side slopes or flatter will be seeded with appropriate vegetation.

Three channel reaches near the head waters of the watershed were recognized as being potential problem areas because of the steep valley gradients. Channel stability in these areas is to be achieved by excavating a wide and shallow channel and seeding the entire cross section to appropriate vegetation. This method of achieving channel stability was considered to be the one most economically feasible after considerable investigation which included the use of gradient control structures.

Excavation along one side of the channel is planned where the planned channel enlargement follows the present channel. This is to minimize erosion during construction. Excavation will be done in such a manner that alignment will be improved and stability maintained or improved. Excavating the inner side of bends will allow the outer banks of bends to remain undisturbed thus, the bank under most severe attack will not be raw and unvegetated in the "as built" condition. Excavation on one side of the channel will also increase the "n" value so that flood flow velocities in the newly constructed channel will not reach the extremes which they would in a smooth, newly-dug earth channel.

The channel conditions in this watershed have been thoroughly investigated and compared with Nances Creek channel located in Terrapin Creek Watershed. Terrapin Creek Watershed is located approximately 25 miles North of Dynne Creek in the same land resource area. Channel material is similar and velocities as proposed are comparable. We expect the same armor plating of the channel bed that we had in Nances Creek. Nances Creek has been looked at by the state, E&WP and Washington engineers and is considered to be satisfactory.

Geologic

Flood plain scour and sediment damages were estimated by measurement of erosion and sedimentation along valley cross-sections and expanding the damage to the acreage represented by sections. The degree of damage was determined in the field at each section by the geologist and economist. Valley sections used were the same as those used by the hydrologist and economist in flood damage computations.

Erosion rates were determined by use of the Musgrave soil loss equation. Erosion calculation was done in detail for Site Nos.1 and 2. Land use, cover, soil, and slope were mapped in detail. Sediment delivery ratios were estimated using a curve based on size of drainage area to percentage of delivered sediment.

Sediment storage requirements were projected for 100-year life of structures using procedures set forth in SCS Technical Release No. 12. Sediment pool elevations are set by the capacity required to store the predicted submerged accumulation, approximately 91 percent of the total. Additional capacity for aerated sediment will be provided in the detention

pool for that portion of the sediment expected to remain above the submerged pool elevations, approximately 9 percent of the total.

Volume weight of soil for erosion computation averaged 95 pounds per cubic foot. Volume weights used in computing required sediment storage are based on the preponderance of medium-textured soils in the contributing areas and are estimated at 53 pounds per cubic foot for submerged sediment and 75 pounds per cubic foot for aerated sediment.

Preliminary geologic investigations were performed at the two dam sites. The sites were investigated by inspection of the surface and examination of road cuts and natural exposures in the vicinity. Conclusions are based in part on experience gained in detailed site investigations of dam sites in seven watersheds in the vicinity which are geologically and topographically similar to Dynne Creek Watershed. Foundations are expected to be firm silts and sands overlying weathered schists at depths of 2 to 10 feet. Abutments consist of silty soils overlying schists. Borrow materials are plentiful but rocky at shallow depth with the most plastic materials being the uppermost 2 to 3 feet. The soils are mostly weathered and disintegrated rock which will act as ML's and GM's according to the degree of disintegration and the method of construction. Most of the borrow material will be excavated from the emergency spillways and adjacent hill locations. Flood plain soils are shallow and will tend to be wet during part of the year.

4-30831 9-71

R-10-E | R-11-E

601 522

85°30'

T 16 S

T 17 S

33°35'

1121 810

DYNNE CREEK WATERSHED

ALABAMA

N

TALLAPOOSA RIVER

Dynne Creek

Lat. 3

R-I

R-II

R-III

R-IV

R-V

R-VI

R-VII

R-VIII

131+00

187+00

208+00

92+50

63+50

35+00

138+00

105+50

156+50

242+50

277+30

319+25

367+00

42

19

1

2

LEGEND

- Poved Road
- Grovel Road
- (19) Stote Highwoy
- Droinage
- Watershed Boundary
- Areo Benefited
- Droinage Area Controlled by Structure
- Floodwoter Retarding Structure
- (1) Structure Site Number
- Channel Improvement for Flood Prevention
- 63+50 Station Number
- R-II Reaches

SITE NUMBERS AND DRAINAGE AREA IN ACRES

Site No.	Acres
1	2054
2	4467

MAP COMPILED AT 1:31,680 AND REPRODUCED WITHOUT REGARD TO SCALE FOR MAXIMUM IMAGE ON SHEET.

USDA-SCS-FORT WORTH, TEX 1971

Figure 1

PROJECT MAP

DYNNE CREEK WATERSHED

CLEBURNE COUNTY, ALABAMA

U S DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

AUBURN ALABAMA

APPROXIMATE SCALE - MILES

APPROX. SCALE 1:41,685

BASE COMPILED FROM MOSAIC A-10 27028

Rev 4-71

4-R-24232

4-R-27030